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Short Communication

First record of the family Atemnidae (Pseudoscorpiones) from Armenia

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Abstract

Diplotemnus balcanicus (Redikorzev, 1928) is reported from Armenia for the first time. This is also the first record of the family Atemnidae for Armenia. The finding is based on one male specimen found in the Ararat region, Angel's Canyon, near Vedi. The description of the main morphological and morphometrical characteristics of the collected specimen is provided.

Key words: Ararat region, Caucasus, *Diplotemnus*, new record, Pseudoscorpion

Introduction

Comprehensive works on the pseudoscorpion fauna of Armenia, together with Azerbaijan and Georgia, were published by Schawaller and Dashdamirov (1988) and Dashdamirov and Schawaller (1992). However, the most recent update on pseudoscorpions of Armenia is given in the World Pseudoscorpion Catalogue (WPC 2024), listing 16 pseudoscorpion species of the five families Cheliferidae, Chernetidae, Neobisiidae, Chthoniidae, and Olpiidae.

The scarcity of research and the number of recorded taxa indicate that the pseudoscorpion fauna of this country is still very poorly studied. In this paper, we report *Diplotemnus balcanicus* (Redikorzev, 1928) as a new record for the Armenian pseudoscorpion fauna, which is also the first reported data of the family Atemnidae in the country. A single male specimen of *D. balcanicus* was collected at Mount Ararat. This species is widely distributed throughout Europe, Asia, and North Africa and also occurs in neighboring countries (Azerbaijan, Turkey, and Iran (WPC, 2024)). Furthermore, a description of the main morphological characteristics of the collected Armenian specimen of *D. balcanicus* is provided.

Materials and methods

The male specimen of *Diplotemnus balcanicus* was collected in the frame of the Caucasus Barcode of Life (CaBOL - https://ggbc.eu/) project by Dr. Jonas Astrin on 14.V.2022 in Armenia (Fig. 1). The specimen was found by sifting leaf litter and extracted with the Wikler extractor.

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The specimen underwent clearing in lactic acid and was examined as a temporary slide using stereo and light compound microscopes (Accu-Scope-Exc-350). Following the lactic acid treatment, the specimen was rinsed in distilled water and then preserved in 70% ethanol. The measurements and photos were acquired through Capta Vision software.

Species identification was based on key references, including Beier (1932), Novák and Harvey (2015), and Krajčovičová et al. (2021). The specimen is deposited at LIB Biobank at Museum Koenig.

Results

Family Atemnidae Kishida, 1929
Genus *Diplotemnus* Chamberlin, 1933

***Diplotemnus balcanicus* (Redikorzev, 1928)**

Material examined. Armenia • 1♂ (ZFMK-TIS-97516); Ararat valley, Angel's Canyon, near the town Vedi; 39°56'52.8"N, 44°44'27.6"E; 1025 m a.s.l.; sifted leaf litter; 14-May.2022; leg: Astrin J.

Short description. Carapace and tergites yellowish-brown, pedipalps dark reddish-brown. Setae on body and palps apically dentate.

Carapace (Fig. 2 A). 1.37x longer than wide, strongly granulated with two transverse furrows. Two pairs of eyes are present, with one pair of preocular setae. Four setae at the anterior and ten on the posterior margin of the carapace. Lyrifissures: two pairs at the anterior, one pair at the medial, and one pair at the posterior disk.

Chelicera. 2.02x longer than broad, with five setae on hand; one seta on the movable finger; serrula exterior with 18 blades; galea not visible (broken); curved teeth at the base of galea present; fixed finger with three small teeth at the marginal end.

Coxae. Pedipalpal coxae with 8 setae; setation of pedal coxae: coxa I :8, coxa II: 8, coxa III: 7(9) and coxa IV 12 setae.

Pedipalp (Fig. 2 B). Robust and strongly granulated; femur 2.91x, patella 2.06x, chela 2.55x, hand with pedicel 2.61x longer than broad. Chelal movable finger shorter than hand without pedicel. Venom apparatus only in fixed finger. Fixed chelal finger with thirty-two, movable finger with thirty-two cusped teeth.

Abdomen. Chaetotaxy of tergites I-XI: 6:6:4:5:6:5:5:5:5:5:4. On the anal cone two short setae visible. Lyrifissures on half of the tergites III-XI: 2:2:2:2:2:2:2:2:4; sternal chaetotaxy: III-XI: 6:8:(?):6:6:6:7:6:5; sternal lyrifissures (on half-tergites): III-XI: 2:2:2:2:2:2:2:4:2.

Legs. Leg I: trochanter 1.25 x, femur 1.71x, patella 2.78x, tibia 3.46x, tarsus 5.08x times longer than broad; leg IV (Fig. 2 C): trochanter 1.67x, femoropatella 3.13x, tibia 4.11x, tarsus 3.97x times longer than broad; one submedial tactile seta (broken) on tarsus IV, somewhat proximal to the middle of the article (Fig. 3).

Dimensions (in mm). Body – 3.27; Carapace – 1.09/0.80 (1.37x); Chelicera – 0.24/0.11 (2.20x); Cheliceral movable finger 0.22; Pedipalp: Femur – 0.89/0.30 (2.91x); Patella – 0.80/0.39 (2.06x); Chela – 1.34/0.52 (2.55x); Hand with pedicel – 1.37; Chelal movable finger – 0.44; Leg I: trochanter – 0.17/0.14 (1.25x);

Figures 1. The map of Armenia with the sampling locality (yellow dot) of the *Diplotemnus balcanicus* specimen studied.

femur – 0.25/0.15 (1.71x); patella – 0.47/0.17 (2.78x); tibia – 0.39/0.11 (3.46x); tarsus – 0.39/0.07 (5.08x). Leg IV: trochanter – 0.29/0.17 (1.67x); femur + patella – 0.87/0.28 (3.13x); tibia – 0.75/0.18 (4.11x); tarsus – 0.45/0.11 (3.97x).

Notes. Besides *Diplotemnus balcanicus*, two other species of the family Atemnidae are known in the neighboring countries: *Atemnus politus* (Simon, 1878) from Azerbaijan, Georgia, Iran, and Turkey, and *A. syriacus* (Beier, 1955) from Turkey (WPC, 2024). Genus *Diplotemnus* differs from *Atemnus* by the following morphological characteristics: a granulated carapace with two distinctive transverse furrows, the presence of two corneate eyes, and having the trichobothrium of leg IV tarsus near the middle of the article (it is basal in Atemnus).

Diplotemnus balcanicus can be distinguished from the other two *Diplotemnus* species of Europe and Asia by the following characters: the number of preocular seta (*D. pieperi* Helversen, 1965 has three preocular seta, whereas *D. balcanicus* only has one), and the smaller body size (*D. egregius* Beier, 1959 pedipalpal femur 1.45–1.65 mm and pedipalpal patella 1.45–1.55 mm in length, whereas in the newly found *D. balcanicus* specimen these measurements range from 0.99–1.25 and 1.08–1.21 mm) (Beier, 1959; Helversen, 1965; Novák and Harvey, 2015; Krajčovičová et al. 2021).

The Armenian specimen is smaller than the Slovakian specimen rediscovered in 2019 (body length: Armenian specimen – 3.27 mm, Slovakian specimen

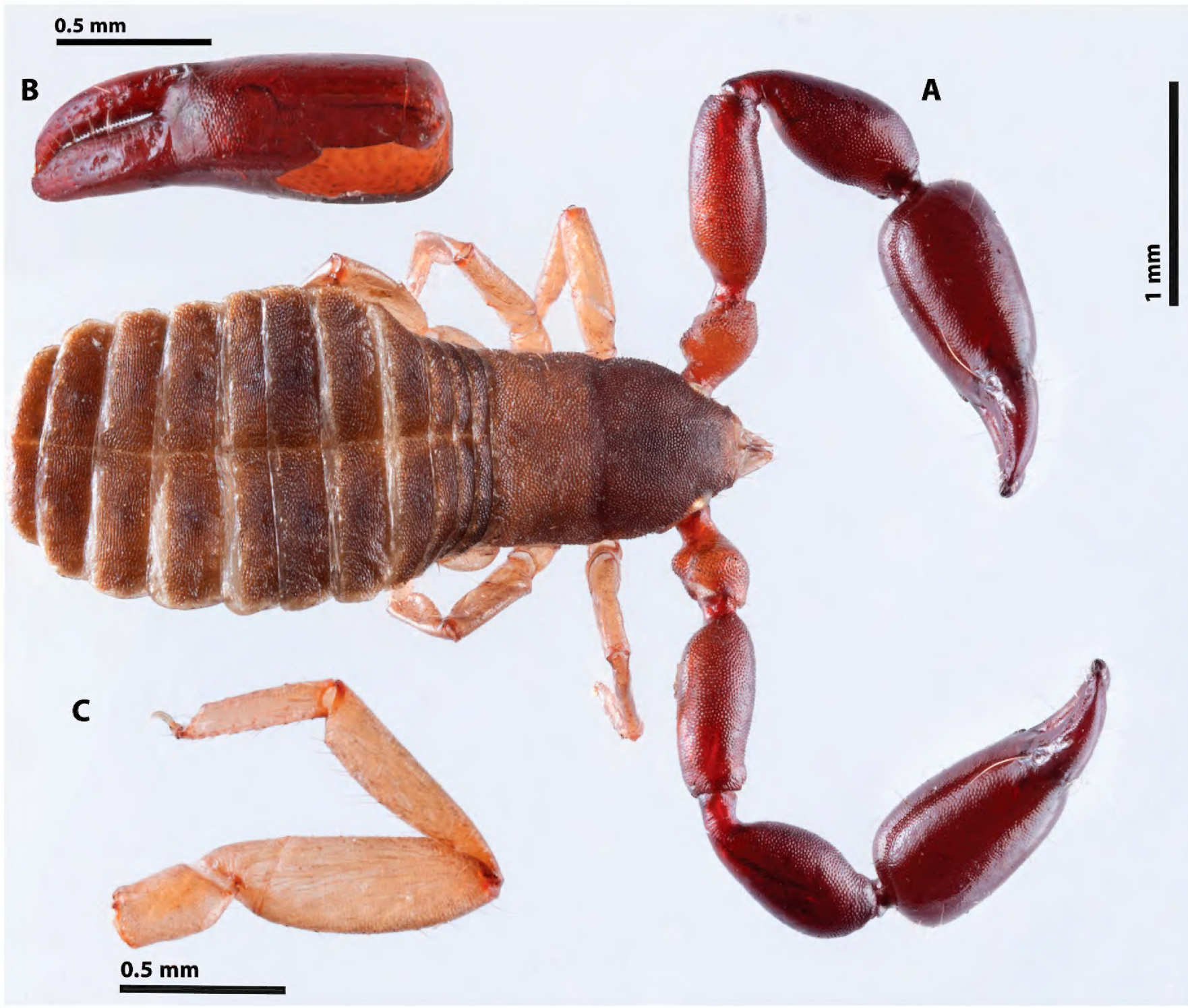

Figure 2. The studied male specimen of *Diplotemnus balcanicus*. **A:** Entire body, dorsal view; **B:** Right chela, lateral view; **C:** Righ Leg IV, lateral view.

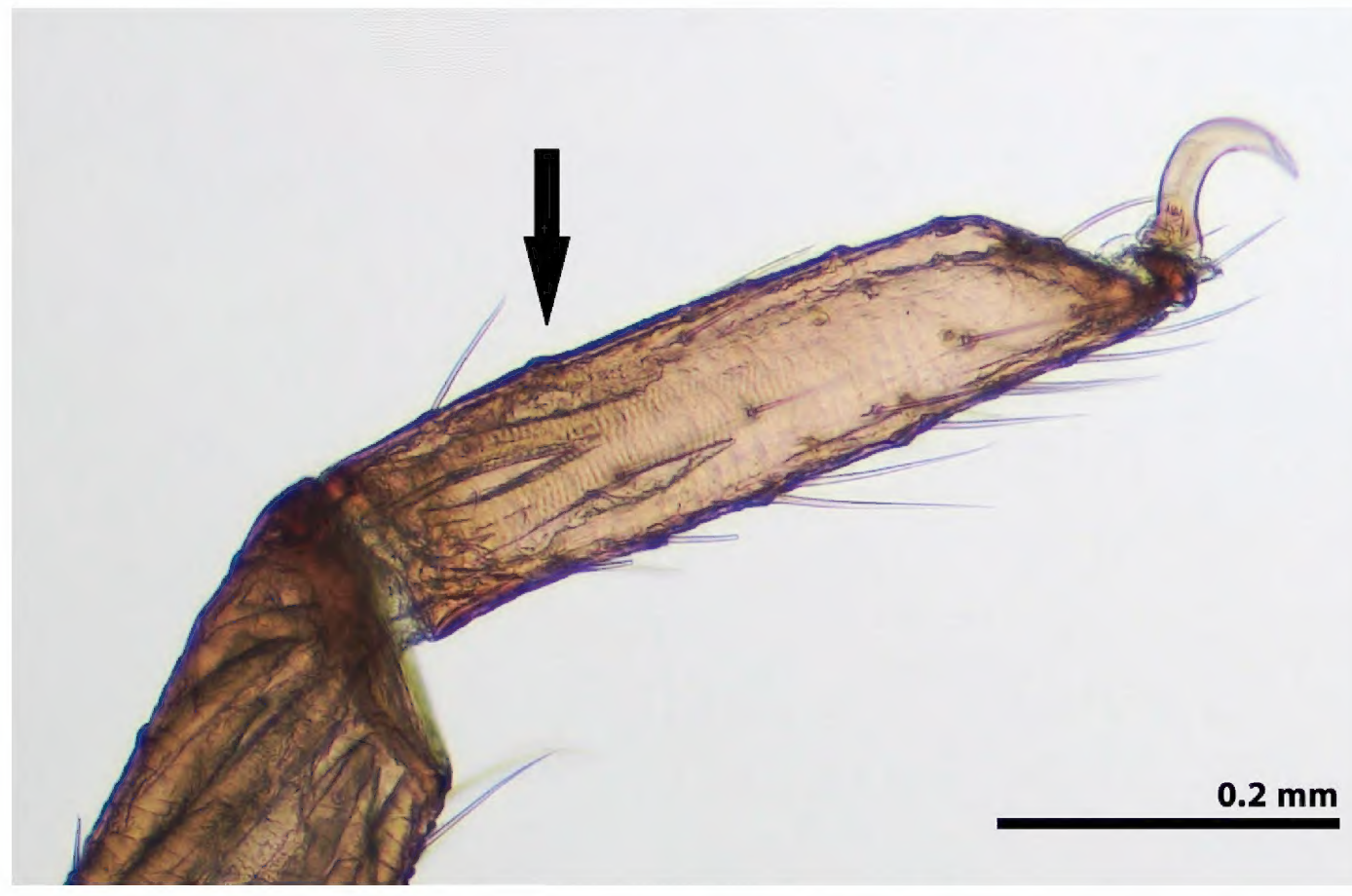

Figure 3. Right leg IV Telotarsus, lateral view. The arrow is pointing at submedial tactile seta.

– 3.75 mm; palpal femur: Armenian specimen – 0.89 mm, Slovakian specimen – 1.25 mm; leg IV femur + patella: Armenian specimen – 0.87 mm, Slovakian specimen – 1.20 mm) (Krajčovičová et al. 2021). This difference can be attributed to geographical distance and intraspecific variation. In a 2015 publication, Novák and Harvey proposed several species as junior synonyms of *Diplotemnus balcanicus* (Redikorzev, 1928). In the original descriptions of the synonymized species, the body dimensions have high variability (Novák and Harvey 2015). Recently synonymized *Diplotemnus lindbergi* (Beier, 1960), distributed in Afghanistan, is the closest to the Armenian specimen in body measurements, as the holotype dimensions are as follows: body length 3.5 mm; carapace length 0.88 mm; pedipalpal femur L/W 0.70/0.27 mm; and chelal movable finger length 0.51 mm (Beier, 1960).

Considering the above-mentioned distinctive characters between the studied specimen and other atemnid taxa, coupled with great interspecific variation and the huge geographical area of *D. balcanicus*, the newly recorded specimen in Armenia can be attributed to *D. balcanicus*, adding further information on the dimensional variation of the species.

Discussion

The pseudoscorpion family Atemnidae Kishinda, 1929, currently comprises 21 genera and 190 species worldwide (WPC 2024).

Diplotemnus is a very widespread genus and has been found in Asia, Africa, and Europe. Currently, there are nine species of *Diplotemnus* known to science, and only *D. balcanicus* is distributed in the Caucasus region (except Georgia). The taxonomic status of *D. balcanicus* was recently clarified by Novák and Harvey (2015), and several taxa were synonymized with it, including *Diplotemnus insolitus* Chamberlin, 1933; *Diplotemnus insolitus sinensis* (Schenkel, 1953); *Diplotemnus vachoni* Dumitresco and Orghidan, 1969; and *Withius soderbomi* (Schenkel, 1937) (Novák and Harvey, 2015). Given the large distribution area and high interspecific variability, molecular genetic methods are further necessary to improve the taxonomic understanding and reveal possible cryptic diversity within this species.

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Additional information

Conflict of interest

The authors have declared that no competing interests exist.

Ethical statement

No ethical statement was reported.

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Data availability

All of the data that support the findings of this study are available in the main text or Supplementary Information.

References

Beier M (1932) Pseudoscorpionidea II. Subord. C. Cheliferinea. De Gruyter, Berlin, 294 pp. https://doi.org/10.1515/9783111385402

Beier M (1959) Zur Kennrnis der Pseudoscorpioniden-Fauna Afghanistans. Zoologische Jahrbücher, Abteilung für Systematik, Ökologie und Geographie der Tiere 87: 257–282.

Beier M (1960) Pseudoscorpionidea. Contribution à l'étude de la faune d'Afghanistan. Förhandlingar vid Kungliga Fysiografiska Sällskapets i Lund 30: 41–45.

Dashdamirov S, Schawaller W (1992) Pseudoscorpions of the Caucasianfauna (Arachnida Pseudoscorpionida). Arthropoda Selecta 1: 31–72.

Helversen O von (1965) Scientific expedition to the Salvage Islands, July 1963. VI. Einige Pseudoskorpione von den Ilhas Selvagens. Boletim do Museu Municipal do Funchal 19: 95–103.

Krajčovičová K, Červená JM, Gajdoš P, Christophoryová J (2021) *Diplotemnus balcanicus* (Redikorzev, 1928) (Pseudoscorpiones, Atemnidae) rediscovered in Slovakia after 65 years. Check List 17: 347–351. https://doi.org/10.15560/17.2.347

Novák J, Harvey MS (2015) The identity of pseudoscorpions of the genus *Diplotemnus* (Pseudoscorpiones: Atemnidae) from Europe and Asia. North-Western Journal of Zoology 11: 316–323.

Schwaller W, Dashdamirov S (1988) Pseudoscorpione aus dem Kaukasus,Teil 2 (Arachnida). Stuttgarter Beiträge zur Naturkunde, Serie A 415: 1–51. [In German]

World Pseudoscorpiones Catalog (2024) World Pseudoscorpiones Catalog. Natural History Museum, Bern. https://wac.nmbe.ch/order/pseu-doscorpiones/3 [accessed at: 2024.10.18]